

EC-Earth ORCA12-T1279

- WP4 - Frontiers of Climate Modelling
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- Develop the next generation of eddy-resolving coupled models.
- Increase the horizontal resolution to explicitly resolve more processes and rely less on sub-gridscale parameterizations.
- WP2 (impact of eddy-resolving ocean on North Atlantic ocean processes), WP5 (assessment of improved resolution on ocean fronts)

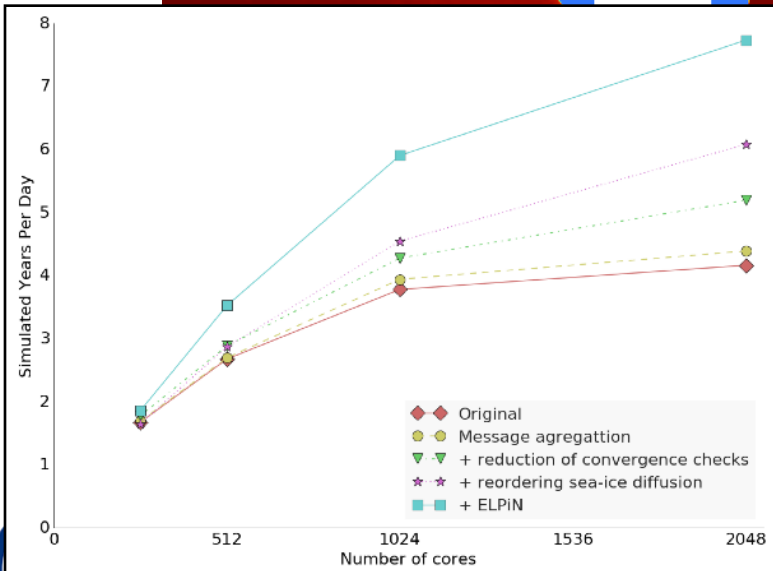
EC-Earth 3.2 ORCA12-T1279 (~15km)

Component	Domain	Δt	# cores	Output (per yr)
NEMO 3.6 LIM 3 (sea-ice) XIOS 2	ORCA12 L75 (~ 15 km)	6 min. 12 min.	54 × 36 → 1449 (495 land proc. saved) 32	1 2D field @ 1day freq → 11 GiB 1 3D field @ 1month freq → 16 GiB 20x 2D fields (daily): (SST, SSS, SSH, MLD, ...) 4x 3D fields (monthly): (T, S, U, V) 20×11GiB + 4×16GiB → ~300GB (packed into netcdf4!)
IFS cy36r4	T1279L91 L91 (~ 15km)	6 min.	1040	6-hourly freq - 1.2 TB / year SH files ~ $\frac{4}{5}$ GG files ~ $\frac{1}{5}$
OASIS MCT	10 days to generate remapping weights ORCA12 – T1279 (sequential jobs)	Coupling 12 min.	-	-
			2521	~ 1.5 TiB / simulated year

- 7h15m for 1 month of simulation on MareNostrum3@BSC
- Cost: ~220 000 core·hour / simulated year

ELPiN

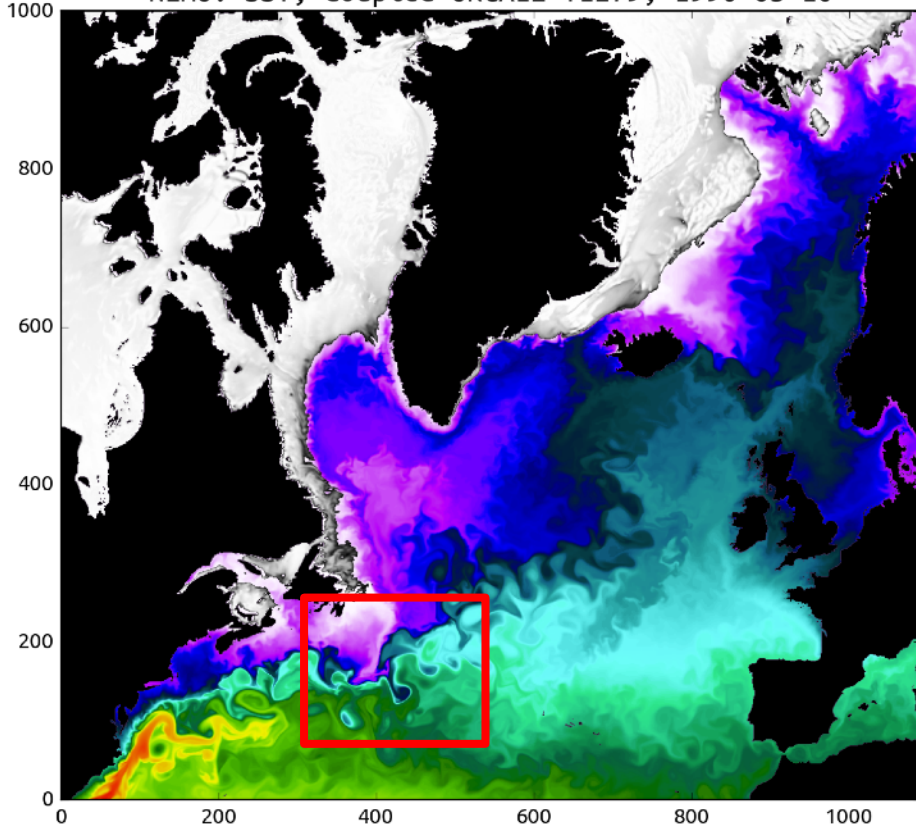
Exclude
Land
Processes
in
NEMO



Oriol Tintó @ BSC

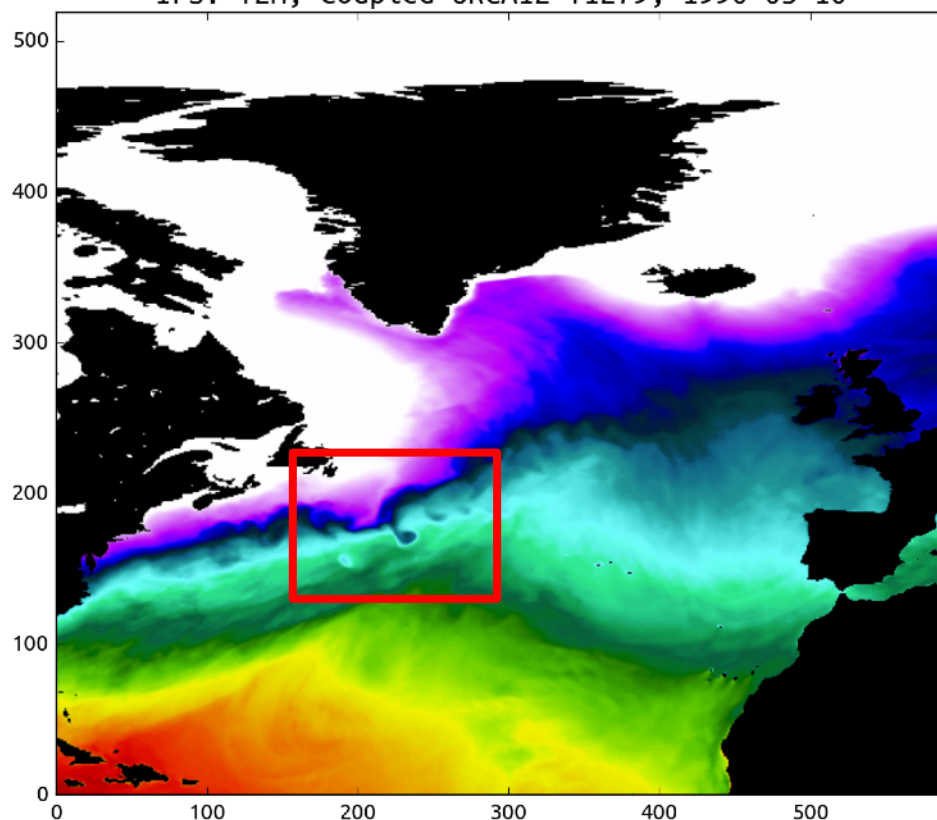
Results

NEMO: SST, coupled ORCA12-T1279, 1990-03-10



NEMO ORCA12

IFS: T2M, coupled ORCA12-T1279, 1990-03-10



IFS T1279

- <https://www.youtube.com/watch?v=AU2zp7a8G0U>
- <https://www.youtube.com/watch?v=JT4ZQAQf5yl>
- For more: <https://www.youtube.com/user/LorenzoMald0nad0>

Plan for 2018:

- MareNostrum4 - Improve scalability and target the efficient use of at least 5000 cores
- Define strategy for data output and storage (online output coarsening, storage capacity growth does not follow CPU growth!)
- Strategy for data analysis!
- A few decades of simulation and some real science!